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UNITED STATES COAST SURVEY, A. D. BACHE, SUPERINTENDENT.

TIDES, CURRENTS, MAGNETIC VARIATION,

AND

GEOGRAPHICAL POSITIONS OF LIGHT-HOUSEES.

CHESAPEAKE BAY AND ITS RIVERS.

1861.

Rare Book  
VK  
982  
P6  
B3  
1861

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ASSISTANTS UNITED STATES COAST SURVEY.

# **National Oceanic and Atmospheric Administration**

## **Notes on the Coast of the United States**

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# TIDES IN CHESAPEAKE BAY AND ITS TRIBUTARIES.

NUMEROUS tidal stations were occupied for longer or shorter periods during the progress of the hydrographic survey of Chesapeake bay. The results have been collected in the following table, (Table I,) which gives the name of the station, the mean interval between the time of the moon's transit and the time of high water, the mean rise and fall of tides, and of spring and neap tides, and the mean duration of the rise and of the fall of the tide, reckoned from the middle of one stand to the middle of the next.

By means of this table, and of an Almanac, the time and height of high water may be obtained for any particular day.

When greater accuracy is desired, the corrections given in Table II are to be applied. This table applies more particularly to Old Point Comfort and Baltimore, but can also be used for places in the lower and upper half of the bay, respectively.

TABLE I.

*Tide tables for Chesapeake bay and rivers.*

Localities.	Mean interval be- tween time of moon's transit and time of high water.	Rise and fall.			Mean duration of—	
		Mean.	Spring.	Neap.	Rise.	Fall.
<i>East shore of bay.</i>						
Fisherman's inlet, Cape Charles .....	7 45	3.2	.....	.....	.....	.....
Hunger's creek .....	9 0	1.8	.....	.....	.....	.....
Sharp's island † .....	2 49	1.1	.....	.....	.....	.....
Cambridge, (Choptank river) † .....	3 18	1.7	.....	.....	.....	.....
Poplar island .....	3 54	1.2	.....	.....	.....	.....
Harrison's wharf, Chester river .....	6 22	1.7	.....	.....	.....	.....
Harris's wharf, below Swan Point .....	5 22	1.3	.....	.....	.....	.....
Sassafras river .....	9 0	1.7	.....	.....	.....	.....
Elk river, (mouth of Bohemia creek) † .....	8 1	2.2	.....	.....	.....	.....
Frenchtown .....	8 37	.....	.....	.....	.....	.....
Northeast river .....	8 49	2.1	.....	.....	.....	.....
Susquehanna river .....	9 24	2.4	.....	.....	.....	.....
<i>West shore of bay.</i>						
Cape Henry .....	7 25	2.4	.....	.....	.....	.....
Old Point Comfort * .....	8 17	2.5	3.0	2.0	6 1	6 25
Norfolk † .....	8 49	2.8	3.3	2.3	5 43	6 43
Newport News † .....	9 9	2.5	3.4	1.7	6 3	6 18
York river entrance .....	8 39	2.4	.....	.....	.....	.....
Piankatank river entrance † .....	10 5	1.3	1.9	0.7	5 51	6 36
Point Lookout * .....	0 32	1.4	1.9	0.7	5 59	6 19
Patuxent river entrance, (Drum Point) † .....	1 16	1.4	1.9	0.7	5 48	6 45
Fairhaven, Herring bay † .....	3 24	1.1	.....	.....	.....	.....
Annapolis * .....	4 38	0.9	1.0	0.8	6 11	6 15
Bodkin Point * .....	5 42	1.0	1.3	0.8	5 23	7 8
Baltimore * .....	6 33	1.3	1.5	0.9	5 54	6 33
Gunpowder river † .....	7 1	1.2	.....	.....	.....	.....
Pool's island † .....	7 13	1.3	.....	.....	.....	.....
Bush river .....	7 50	1.3	.....	.....	.....	.....
Havre de Grace .....	8 47	2.4	.....	.....	.....	.....

TABLE I.—*Tide tables for Chesapeake bay and rivers—Continued.*

Localities.	Mean interval between time of moon's transit and time of high water.	Rise and fall.			Mean duration of—	
		Mean.	Spring.	Neap.	Rise.	Fall.
<i>Rivers.</i>						
City Point, James river † .....	h. m.	Feet.	Feet.	Feet.	h. m.	h. m.
2 11		2.8	3.0	2.5	5 14	6 58
Curt's Neck, James river † .....	3 31	3.2	3.4	2.8	5 32	6 54
Richmond, James river † .....	4 28	2.9	3.4	2.3	4 53	7 31
Petersburg, Appomattox river † .....	4 45	2.6	.....	.....	4 57	7 35
Moody's wharf, York river.....	9 35	3.0	.....	.....	.....	.....
Tappahannock, Rappahannock river *.....	0 42	1.6	1.8	1.3	5 21	7 6
Saunders' wharf, Rappahannock river † .....	3 2	1.5	.....	.....	5 47	7 12
Washington Navy Yard *....	7 44	3.0	3.4	2.5	5 37	6 49
Hunting creek, Patuxent river .....	2 38	1.6	.....	.....	.....	.....

NOTE.—The stations marked with a \* are the most reliable, being derived from several months observations; in most cases even more than a year's. Those marked with a † are good; the other ones rough approximations, being based on few observations. The rise and fall of spring tides is greater and of neap tides smaller than the mean by about half a foot. The duration of rise and of fall of the tide may be deduced from such places where it is not given, from the nearest complete station, recollecting, however, that the further up a river the shorter the duration of rise and the longer the duration of fall.

The following table gives the corrections to be applied to the mean interval between the time of the moon's transit and the time of high water, and also to the mean rise and fall at Old Point Comfort and Baltimore for every half hour of the moon's transit:

TABLE II.

Time of moon's transit or southing.	Old Point Comfort.			Baltimore.		
	Correction to mean interval.		Correction to mean rise and fall.	Correction to mean interval.		Correction to mean rise and fall.
	h. m.	m.	ft.	h. m.	m.	ft.
0 0	Add	16	Add	0.4	Add	14
0 30		10				9
1 0		4		0.5		4
1 30	Subtract	2			Subtract	2
2 0		8		0.4		7
2 30		13				12
3 0		17		0.1		16
3 30		21				20
4 0		25	Subtract	0.2		22
4 30		28				23
5 0		29		0.4		23
5 30		27				20
6 0		24		0.5		14
6 30		17				8
7 0		10		0.5		1
7 30		2			Add	6
8 0	Add	7		0.3		11
8 30		16				16
9 0		23		0.0		19
9 30		28				21
10 0		31	Add	0.3		21
10 30		31				21
11 0		29		0.5		17
11 30		23			Add	0.1
						15

By means of these numbers, Tables III, IV, and V have been computed, giving the times of high water at Old Point Comfort, Annapolis, and Baltimore, for the months of June, July, and

August, 1861. The average probable error of the times given in them is about 20 minutes; but the error may amount to more than an hour when the tide is disturbed by the wind. This is more likely to be the case near the head of the bay and rivers than near the mouth. At Washington northerly and westerly winds depress, and southerly and easterly elevate, the level of the water in the river. As a general rule, northerly winds will depress or southerly winds elevate the mean level of the water in the upper part of the bay. In the rivers and lateral bays this effect will be slightly modified by their direction.

TABLE III.

*Approximate mean time of high water at Old Point Comfort, Virginia, for June, July, and August, 1861.*

Day of month.	June.		July.		August.	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
1	2 25	2 50	2 24	2 50	3 35	4 7
2	3 15	3 40	3 16	3 45	4 41	5 16
3	4 7	4 35	4 15	4 45	5 48	6 18
4	5 2	5 25	5 16	5 46	6 48	7 15
5	5 55	6 21	6 16	6 45	7 41	8 2
6	6 47	7 11	7 12	7 37	8 22	8 42
7	7 35	7 57	8 1	8 21	9 12	9 22
8	8 17	8 37	8 41	9 3	9 42	10 1
9	8 59	9 20	9 24	9 44	10 22	10 43
10	9 41	10 2	10 4	10 25	11 5	11 28
11	10 24	10 45	10 45	11 7	11 52	.....
12	11 6	11 29	11 28	11 48	0 14	0 40
13	11 50	.....	.....	0 10	1 9	1 41
14	0 11	0 34	0 33	0 58	2 15	2 52
15	0 58	1 24	1 25	1 55	3 30	4 9
16	1 51	2 20	2 28	3 2	4 46	5 23
17	2 51	3 23	3 39	4 16	5 57	6 28
18	3 57	4 33	4 55	5 33	6 56	7 22
19	5 9	5 44	6 9	6 43	7 44	8 4
20	6 20	6 53	7 13	7 40	8 22	8 39
21	7 23	7 52	8 4	8 26	8 57	9 13
22	8 16	8 40	8 46	9 5	9 30	9 47
23	9 4	9 26	9 25	9 44	10 4	10 21
24	9 49	10 11	10 2	10 20	10 39	10 57
25	10 31	10 52	10 38	10 56	11 17	11 35
26	11 13	11 32	11 15	11 33	11 54	.....
27	11 51	.....	11 51	.....	0 15	0 38
28	0 10	0 29	0 10	0 29	1 3	1 29
29	0 50	1 11	0 50	1 13	1 57	2 29
30	1 34	2 8	1 38	2 4	3 1	3 34
31	.....	.....	2 34	3 3	4 9	4 42

NOTE.—It is low water 6h. 25m. after the time of high water.

TABLE IV.

*Approximate mean time of high water at Baltimore, Md., for June, July, and August, 1861.*

Day of month.	June.		July.		August.	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
1	0 50	1 15	0 49	1 15	1 59	2 29
2	1 39	2 4	1 40	2 9	2 59	3 30
3	2 29	2 53	2 36	3 2	4 0	4 27
4	3 18	3 41	3 30	3 57	4 52	5 19
5	4 5	4 29	4 25	4 50	5 44	6 9
6	4 52	5 15	5 16	5 41	6 33	6 57
7	5 38	6 2	6 6	6 32	7 18	7 39
8	6 26	6 51	6 56	7 19	7 59	8 18
9	7 14	7 36	7 40	8 0	8 39	9 1
10	7 57	8 19	8 21	8 42	9 22	9 45
11	8 41	9 2	9 2	9 24	10 9	10 35
12	9 25	9 46	9 45	10 7	11 2	11 32
13	10 9	10 32	10 30	10 55	.....	0 5
14	10 56	11 21	11 21	11 49	0 41	1 18
15	11 48	.....	.....	0 20	1 54	2 30
16	0 17	0 45	0 53	1 27	3 4	3 37
17	1 17	1 48	2 3	2 37	4 7	4 36
18	2 20	2 52	3 12	3 46	5 1	5 25
19	3 25	3 56	4 19	4 48	5 48	6 11
20	4 28	4 58	5 17	5 44	6 32	6 54
21	5 27	5 56	6 10	6 37	7 13	7 30
22	6 25	6 55	7 1	7 10	7 47	8 4
23	7 19	7 42	7 42	8 0	8 21	8 38
24	8 5	8 27	8 19	8 37	8 56	9 14
25	8 47	9 9	8 55	9 13	9 33	9 53
26	9 30	9 49	9 32	9 50	10 14	10 36
27	10 10	10 30	10 10	10 30	11 0	11 25
28	10 51	11 12	10 51	11 12	11 53	.....
29	11 34	11 58	11 36	.....	0 25	0 54
30	.....	0 24	0 2	0 30	1 26	1 57
31	.....	.....	0 59	1 29	2 30	3 0

NOTE.—It is low water 6h. 33m. after the time of high water.

TABLE V.

*Approximate mean time of high water at Annapolis, Md., June, July, and August, 1861.*

Day of month.	June.		July.		August.	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
1	11 20	11 44	11 20	11 45	0 4	0 34
2	.....	12 09	.....	12 14	1 4	1 35
3	0 34	12 59	0 41	1 08	2 5	2 32
4	1 23	1 46	1 35	2 02	2 58	3 24
5	2 10	2 34	2 30	2 55	3 50	4 13
6	2 57	3 20	3 21	3 47	4 38	5 2
7	3 44	4 07	4 12	4 37	5 23	5 45
8	4 32	4 56	5 01	5 24	6 4	6 23
9	5 19	5 42	5 46	6 05	6 44	7 6
10	6 02	6 24	6 26	6 47	7 27	7 50
11	6 45	7 07	7 07	7 29	8 14	8 40
12	7 30	7 51	7 50	8 12	9 7	9 37
13	8 14	8 37	8 35	9 00	10 11	10 46
14	9 01	9 26	9 26	9 54	11 22	11 59
15	9 53	10 22	10 25	10 58	.....	0 36
16	10 51	11 21	11 32	.....	1 9	1 42
17	11 53	.....	0 07	12 42	2 12	2 41

TABLE V—Continued.

Day of month.	June.		July.		August.	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
18	h. m.	h. m.				
	0 25	12 57	1 17	1 21	3 6	3 31
19	1 30	2 01	2 24	2 53	3 53	4 15
20	2 33	3 03	3 22	3 49	4 37	4 59
21	3 33	4 01	4 15	4 42	5 17	5 35
22	4 31	5 00	5 06	5 26	5 52	6 9
23	5 26	5 49	5 48	6 05	6 26	6 44
24	6 10	6 33	6 24	6 43	7 1	7 19
25	6 54	7 14	7 00	7 18	7 38	7 58
26	7 35	7 55	7 37	7 55	8 19	8 41
27	8 15	8 35	8 15	8 35	9 5	9 30
28	8 56	9 17	8 56	9 17	9 58	10 28
29	9 39	10 04	9 41	10 07	10 58	11 31
30	10 29	10 54	10 34	11 04	.....	0 3
31	.....	.....	11 33	.....	0 36	1 5

NOTE.—It is low water at Annapolis 6h. 15m. after the time of high water. It is high water at Havre de Grace about 4h. 9m. after the time of high water at Annapolis.

#### *Co-tidal lines of Chesapeake bay.*

The co-tidal lines are drawn on the chart from the observed mean tidal establishments of the coast, bay, and rivers. They show the mean interval between high water (middle of stand) and the moon's transit immediately preceding, and thus serve, in connection with the table of the half-monthly inequality of this interval, (Table II,) to determine the time of high water anywhere within the limits of the curves. The curves are drawn for intervals of half hours, and it will be seen that the tide-wave takes over twelve hours to go up the bay. If it is high water at the entrance and near the head of the bay, there will be at the same time a low water somewhere above the middle of the bay, and *vice versa*. These co-tidal lines also serve for the purpose of predicting the establishment of the current, (the horizontal component of the tidal wave,) according to the rules given under the head "Current."

The numbers in brackets, below the co-tidal hours, indicate the mean rise and fall in feet and decimals. For other periods of the half-monthly inequality Table II gives the necessary small correction for any particular case. The average uncertainty in the position of the curves may be estimated at about half an hour, and at about three-quarters of an hour in localities where observations are scanty. In the rivers much depends upon interpolation.

The tidal, as well as the current establishments here presented, should be considered as approximate, the observations being as yet incomplete.

#### *Currents in Chesapeake bay.*

*Time.*—At the entrance of the bay the ebb current begins three hours after the high water stand, (or nearly midway between high and low water;) between the mouths of the Rappahannock and York rivers this interval is about 1h. 45m.; in the vicinity of Annapolis it is but one hour, and at the head of the bay there is only half an hour between the high water stand and the commencement of the ebb current. The epoch of the beginning of the ebb, or outgoing stream, can be predicted, as well as the tides, (vertical motion,) by means of the ordinary tidal high water computation with the data furnished by the chart and the above stated differences,

according to the position in the bay. To find the beginning of the flood, add to the time so found the duration of the ebb and the duration of slack water between ebb and flood current, as given below. The average uncertainty in the current epoch may be estimated as one hour, the principal disturbing agency being the wind.

*Direction.*—The true direction of the ebb and flood current is indicated on the chart, the former by a half arrow ↓ the latter by a full arrow ↑. This direction refers to the time when the current runs with its greatest velocity.

*Velocity.*—The maximum velocity expressed in miles (nautical) per hour is written against the arrow, for ebb and flood respectively. The average greatest velocity of the ebb stream is 0.92m. and of the flood stream 0.86m., showing the slight effect due to the discharge of river water. At the entrance the maximum velocity of the ebb and flood is on the average 1.1m. Further up the bay it diminishes to 0.9m. and at the head of the bay it again increases to 1.0m.

*Duration of slack water and of ebb and flood current.*—The duration of slack water, preceding the ebb and flood, is sensibly equal, and does not appear to vary much from 20 minutes between the entrance and the head of the bay. At the entrance, and in Hampton Roads, the duration of the ebb and flood stream is nearly the same, namely, 5h. 50m.; but as we go up the bay the duration of ebb increases, while the flood diminishes. North of the mouth of the Potomac, these intervals are nearly as 6h. 26m. and 5h. 20m.; and near the head of the bay the duration of ebb may reach 7h. and the duration of the flood current be as short as 4h. 45m.

#### *Magnetic Variation.—Chesapeake bay.*

The curves (nearly straight lines) with the magnetic variation marked on the chart in half degrees represent the combined results of the separate determinations, given in the accompanying table. The epoch to which the observations have been referred is July, 1861, and by adding  $2\frac{1}{2}$  minutes for each year following, the variation may be ascertained at any station for any year within the limits of the curves, during the next ten years.

The curves referred to are first approximations, and will be subject to future correction as our data become more complete. The greatest uncertainty may be taken as a quarter of a degree; but for the two lower curves ( $1\frac{1}{2}^{\circ}$  and  $2^{\circ}$  W.) it may amount to half a degree.

*Table of observed variations of the magnetic needle between Delaware bay and the entrance to Chesapeake bay, inclusive of the Chesapeake bay and rivers, with results brought up to the middle of the year 1861.*

Station.	Latitude N.	Longitude W.	Date.	Observed declination W.	Reduction to 1861.5.	Decl'n W. 1861.5.
Wilmington .....	39° 45'	75° 34'	1846.4	2° 31'	+37	3° 08'
Sawyer .....	43	75° 34	1846.5	2° 48	37	3° 25
Fort Delaware .....	35	75° 34	1846.5	3° 17	37	3° 54
Susquehanna Light.....	32	76° 05	1847.5	2° 14	35	2° 49
Osborn's Ruin .....	28	76° 17	1845.5	2° 32	40	3° 12
Hawkins .....	26	75° 17	1846.5	2° 59	37	3° 36
Pine Mount .....	25	75° 20	1846.5	3° 14	37	3° 51
Finlay .....	24	76° 31	1845.5	2° 15	40	2° 55
Bombay Hook .....	22	75° 30	1846.5	3° 18	37	3° 55
Rosanne .....	17	76° 43	1845.4	2° 11	40	2° 51
Pool's Island .....	17	76° 15	1847.5	2° 29	35	3° 04
Fort McHenry .....	16	76° 35	1856.7	2° 29	12	2° 41
Port Norris .....	15	75° 01	1846.5	3° 04	37	3° 41
North Point .....	12	76° 26	1846.5	1° 37	37	2° 14
Egg Island .....	10	75° 08	1846.5	3° 03	37	3° 40

Table of observed variations of the magnetic needle between Delaware bay and the entrance to Chesapeake bay—Continued.

Station.	Latitude N.	Longitude W.	Date.	Observed declination W.	Reduction to 1861.5.	Decl'n W. 1861.5.
Bodkin .....	39 08	76 25	1847.4	2 02	35	2 37
Soper .....	05	76 57	1850.6	2 07	27	2 34
Webb .....	05	76 40	1850.9	2 08	26	2 34
Kent Island (1) .....	02	76 19	1849.5	2 30	30	3 00
Taylor .....	00	76 28	1847.4	2 18	35	2 53
Town Bank .....	38 59	74 57	1846.5	2 59	37	3 36
Cape May Light .....	56	74 57	1855.6	3 45	15	4 00
Causten .....	55	77 04	1855.8	1 06	15	1 21
Hill .....	54	76 52	1850.7	2 19	27	2 46
South Base, Kent Island .....	54	76 22	1845.4	2 24	40	3 04
Washington, C. S. O. ....	53	77 00	1860.8	2 27	2	2 29
Marriott .....	52	76 36	1849.5	2 05	30	2 35
Lewes Landing .....	49	75 12	1846.5	2 45	37	3 22
Pilot Town .....	47	75 09	1846.5	2 43	37	3 20
Cape Henlopen .....	46	75 05	1856.6	3 04	12	3 16
Oxford .....	41	76 10	1856.7	2 41	12	2 53
Dagsborough .....	35	75 15	1856.6	2 41	12	2 53
Davis .....	20	75 06	1853.7	2 33	20	2 53
Brown's Island, Fredericksburg .....	18	77 27	1856.7	1 02	12	1 14
Mason's Landing .....	14	75 15	1856.6	2 23	12	2 35
Snead .....	37 58	75 26	1856.7	2 18	12	2 30
Joynes .....	42	75 37	1856.7	2 03	12	2 15
Mayo's Island, Richmond .....	32	77 26	1856.7	0 15	12	0 27
Scott .....	20	75 54	1856.7	1 37	12	1 49
Roslyn, Petersburg .....	14	77 24	1852.7	0 26	22	0 48
Cape Charles .....	07	75 58	1856.7	1 35	12	1 47
Old Point Comfort .....	00	76 18	1853.7	1 15	12	1 27
Cape Henry .....	36 56	76 00	1856.7	1 28	12	1 40
Norfolk .....	50	76 17	1856.7	1 36	12	1 48

NOTE.—The present annual increase is nearly  $2\frac{1}{2}$ , and will probably not sensibly change for the next ten years.

## List of lights on Chesapeake bay and vicinity.\*

Name of lights.	Latitude.	Longitude.		Visibility in nautical miles, eye elevated 13 feet.
		In arc.	In time.	
<i>Approaches to the Chesapeake.</i>				
Assateague .....	N. 37 54 37	W. 75 21 04	5 01 24.2	14.6
Hog Island .....	37 23 16	75 41 35	5 02 46.4	13.2
Cape Charles, or Smith's island .....	37 07 48	75 52 13	5 03 28.8	14.0
Cape Henry .....	36 55 29	76 00 12	5 04 00.8	17.5
<i>Hampton Roads.</i>				
Willoughby's Spit Light-vessel .....	37 00 1	76 14.8	5 04 59	{ 12.3 11.1
Old Point Comfort .....	37 00 02	76 18 06	5 05 12.4	12.3
Old Point Comfort Beacon Light, (approximate) .....	37 00 0	76 18.5	5 05 14	9.5
Craney Island, (approximate) .....	36 53.3	76 20.6	5 05 32	12.5
Naval Hospital, (approximate) .....	36 50.8	76 17.8	5 05 11	.....
<i>James river.</i>				
White Shoal, (approximate) .....	37 01.4	76 31.5	5 06 06	10.3
Point of Shoals, Burwell's Bay, (approximate) .....	37 03.8	76 39.2	5 06 37	10.3
Deep Water Shoals, (approximate) .....	37 08.2	76 38.0	5 06 32	10.3
Jordan's Point .....	37 18 43	77 13 06	5 08 52.4	11.1
<i>Chesapeake bay.</i>				
Back River .....	37 05 10	76 15 54	5 05 03.6	11.1
Cherry Stone, (approximate) .....	37 15.6	76 01.8	5 04 07	11.2

\* Names taken from list of the Light-house Board.

*List of lights on Chesapeake bay and vicinity—Continued.*

Name of lights.	Latitude.	Longitude.			Visibility in nautical miles, eye elevated 13 feet.
		In arc.	In time.		
<i>Chesapeake bay—Continued.</i>					
York Spit Light-vessel .....	N. 37 12.0	W. 76 13.7	h. m. s.		11.6
New Point Comfort .....	37 18 00	76 16 22	5 04 55		13.2
Wolf Trap Light-vessel .....	37 23.3	76 10.0	5 05 05.5	{	11.4
Stingray Point, (approximate).....	37 33.6	76 16.0	5 04 40		10.6
Windmill Point Light-vessel .....	37 34.8	76 11.5	5 05 04		11.2
			5 04 46		11.0
<i>Rappahannock river.</i>					
Bowler's Rock Light-vessel.....	37 49.2	76 43.3	5 06 53		.....
<i>Chesapeake bay.</i>					
Watt's Island.....	37 46 53	75 53 18	5 03 33.2		12.1
Smith's Point Light-vessel.....	37 52.7	76 10.1	5 04 40	{	11.1
Jane's Island Light-vessel.....	37 57.6	75 55.4	5 03 42		11.5
Point Lookout.....	38 02 16	76 19 01	5 05 16.1		10.6
					11.3
<i>Potomac river.</i>					
Piney Point.....	38 08 03	76 31 29	5 06 05.9		11.1
Blackstone Island.....	38 12 23	76 44 24	5 06 57.6		12.1
Lower Cedar Point Light-vessel .....	38 21	77 00.5	5 08 02		9.7
Upper Cedar Point Light-vessel.....	38 24	77 03.5	5 08 14		10.4
Fort Washington, (approximate).....	38 43.4	77 01.2	5 08 05		.....
Jones's Point, (approximate) .....	38 47.4	77 01.4	5 08 06		11.1
<i>Chesapeake bay.</i>					
Fog Point .....	38 02 04	76 02 15	5 04 09.0		10.6
Hooper's Straits Light-vessel.....	38 13.0	76 05.0	5 04 20		11.0
Clay Island.....	38 13 53	75 58 08	5 03 52.6		11.2
Cove Point .....	38 23 07	76 22 36	5 05 30.4		12.1
Sharp's Island .....	38 37 44	76 21 55	5 05 27.7		11.7
Thomas's Point.....	38 54 25	76 26 53	5 05 47.6		13.5
Greenbury's Point, (approximate) .....	38 58.5	76 27.0	5 05 48		12.5
Sandy Point, (approximate) .....	39 01.0	76 28.5	5 05 34		12.5
<i>Patapsco river.</i>					
Bodkin Tower, (light discontinued).....	39 08 02	76 25 10	5 05 40.6		.....
Seven-foot Knoll, (approximate).....	39 09.3	76 23.9	5 05 36		11.9
North Point Lower Light.....	39 11 36	76 26 12	5 05 44.8	{	10.9
North Point Upper Light .....	39 11 46	76 26 36	5 05 46.4		11.8
Fort Carroll.....	39 12 50	76 30 55	5 06 03.7		11.3
Lazaretto Point.....	39 15 42	76 33 59	5 06 15.9		11.1
<i>Upper Chesapeake bay.</i>					
Pool's Island .....	39 17 23	76 15 41	5 05 02.7		11.1
Turkey Point.....	39 26 56	76 00 12	5 04 00.8		13.6
Fishing battery, (approximate) .....	39 29.6	76 04.7	5 04 19		11.2
Havre de Grace.....	39 32 23	76 04 47	5 04 19.1		11.6

NOTE.—Many of these lights are now probably extinguished, and light-boats may have been removed. The towers may still serve as day marks.